Effects of turbulent mixing on droplets formation

Submitted by Thierry Lemenand on Mon, 03/09/2015 - 10:11

Titre	Effects of turbulent mixing on droplets formation
Type de publication	Communication
Type	Communication sans actes dans un congrès
Année	2002
Langue	Anglais
Date du colloque	24-26/11/2002
Titre du colloque	APS Division of Fluid Dynamics 55th Annual Meeting
Auteur	Lemenand, Thierry [1], Peerhossaini, Hassan [2], Zellouf, Y. [3], Della Valle, Dominique [4]
Pays	Etats-Unis
Editeur	APS (American Physical Society)
Ville	Dallas
Résumé en anglais	The emulsification process in a vortex generating static mixer in turbulent flow is investigated.This type of mixer generates coherent large-scale structures, enhancing momentum transfer in the bulk flow and hence providing favourable conditions for phase dispersion.The mixer design is based on curved baffles fixed on the tube walls that generate large-scale longitudinal vortices.The study focuses on the granulometric characterization of oil emulsions in water obtained with the static mixer. The stability of the emulsion is obtained by encapsulating of oil drops, and droplets are sized using optical microscopy. The mean size, size distribution, and power consumption are compared with those in some existing devices. The size distribution was modelled according to the method proposed by Schwarz and Bezemer. In a log-linear coordinate system the data showed a linear relation between the cumulative volume (in droplet diameters and the inverse of the bounding diameter d, showing this model is verified here. From the energy consumption point of view, it was shown that in some range of interfacial areas this mixer is 1000 times more energy efficient than other mixers.
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Liens

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